

WHAT IS CLAIMED IS

1. A process of fabricating a high resistance CMOS resistor, comprising the steps of:
 - providing a p-type silicon substrate;
 - forming an n-well in said p-type silicon substrate;
 - forming a p-well in a non-active area of said p-type silicon substrate;
 - forming a pad oxide layer on the surface of said p-type silicon substrate;
 - forming a first p-field region into said p-well and a second p-field region into said n-well, wherein said second p-field region forms a CMOS resistor;
 - forming a field oxide layer over said CMOS resistor;
 - forming an n-type contact region in said n-well;
 - forming two p-type contact regions respectively as a first ohmic contact and a second ohmic contact of said CMOS resistor respectively;
 - forming a patterned BPSG layer to build two contact openings exposing a portion of said n-type contact region and said two p-type contact regions;
 - forming two metal contact plugs in said contact openings to electrically connect to said first ohmic contact and said second ohmic contact of said CMOS resistor; and
 - depositing a passivation layer over said contact plugs covering said CMOS resistor.
2. The method of claim 1, wherein said p-type silicon substrate is doped with boron ions, and has a resistance in a range of 8Ω to 12Ω per cm.
3. The method of claim 1, wherein said n-well is formed by implanting phosphorus ions using an energy level of 100KeV, and with a dosage level in a range of 6×10^{12} to 9×10^{12} ions/cm².

4. The method of claim 1, wherein said p-well is formed by implanting boron ions using an energy level of 40KeV, and with a dosage level in a range of 8×10^{12} to 9×10^{12} ions/cm².
5. The method of claim 1, further comprising a step of performing a thermal annealing process at a temperature of 1150°C for diffusing ions of said n-well and said p-well into respective regions in said p-type silicon substrate.
6. The method of claim 1, wherein said pad oxide is grown to a thickness of 350 angstroms at a temperature of 900°C.
7. The method of claim 1, further comprising a step of growing a nitride layer to a thickness of 1250 angstroms at a temperature of 850°C and etching said nitride layer to form a patterned mask layer which serves as a mask for forming said first p-field region and said second p-field region.
8. The method of claim 1, wherein said first p-field region and said second p-field region are formed by implanting boron ions using an energy level of 50KeV, and with a dosage level in a range of 4×10^{13} to 6×10^{13} ions/cm².
9. The method of claim 1, wherein said field oxide layer is grown to a thickness of 5000 to 6000 angstroms by performing a thermal annealing process at a temperature of 980°C.
10. The method of claim 1, wherein said n-type contact region is formed by implanting arsenic using an energy level of 80KeV, and with a dosage level of 4×10^{15} to 6×10^{15} ions/cm².
11. The method of claim 1, wherein said two p-type contact regions are formed by implanting boron ions using an energy level of 25KeV, and with a dosage level of 2×10^{15} to 4×10^{15} ions/cm².
12. The method of claim 1, wherein said metal contact plugs comprises AlSiCu.

13. The method of claim 1, wherein said BPSG layer has a thickness in a range of 5000 to 8000 angstroms.
14. The method of claim 1, wherein said passivation layer is an oxide layer having a thickness in a range of 5000 to 10000 angstroms.
15. The method of claim 1, wherein said CMOS resistor has at least a resistance of 10 k Ω per square.
16. The method of claim 1, wherein said process is compatible with a standard CMOS processes.